

REMARKS

(1) Claims 1 and 3-23 are pending in this application, of which claims 1, 18 and 19 have been amended and claims 24-26 have been added.

(2) Claims 1 and 3-23 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lyons (U.S. Patent No. 6,270,929) in view of Nozaki (WO 03/014830).

(i) Claims 1, 18 and 19 have been amended to clarify the invention. The support of the amendment is found at page 13, lines 10-12. Amended claim 1 recites “a sidewall of the photoresist film in the opening having hydrophilicity and affinity with a chemical liquid, and the hydrophilicity and affinity being increased upward.” Amended claim 1 further recites “reacting the chemical liquid...with the photoresist film... to swell the photoresist film and to reverse-taper the sidewall of the photoregist film in the opening.” Claims 18 and 19 include similar limitations to claim 1.

(ii) The Examiner states that in Lyons et al., “[o]nce the photoresist is swelled an opening is formed which is smaller than the original opening, with the top of the opening being smaller than the bottom of the opening.” Page 2 of the outstanding Office Action. Lyons et al. teach forming an opening 72 of a photoresist layer 70 on an insulating layer 68. *See* Fig 7 and

col. 5, lines 25-34. As asserted by the Examiner, Lyons et al. teach swelling the resist layer 70. *See* col. 5, lines 51-63.

(iii) However, Lyons et al. do not teach any sidewall of the opening 72 of the resist film 70 having hydrophilicity and affinity with a chemical liquid, while the hydrophilicity and affinity are increased upward. Lyons et al. do not teach reverse-tapering the sidewall of the photoresist film in the opening. As shown in Figs. 7 and 8 of Lyons et al., the sidewall of the photoresist layer 70 in the opening 72 is uniformly swelled. The insulating layer 68 is not a resist film. The sidewall of the opening 72 of the photoresist layer 70 is not reverse-tapered. *See* Fig. 8.

The Examiner might have considered that the openings 72 formed by the resist film 70 and the insulating layer 68 are as a whole shaped into a reverse-tapered form. However, such an interpretation is incorrect because the insulating layer 68 is not a resist film to be swollen. Lyons et al. do not teach that the insulating layer 68 swells.

(iv) Examiner cites Nozaki et al. as a secondary reference and states that “some of specifics” which Lyons et al. do not teach are taught by Nozaki et al. as discussed in the Office Action dated March 22, 2007. Page 3, lines 1-2 of the outstanding Office Action. However, Nozaki et al., at least, do not teach or suggest reverse-tapering the sidewall of the photoresist film in the opening.

Amendment
Application No. 10/804,179
Attorney Docket No. 042256

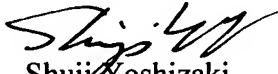
(v) The Supreme Court reiterated the framework for objective analysis for determining obviousness stated in Graham v. John Deere Co., 383 U.S. 1 (1966). KSR International Co., v. Teleflex Inc., 127 S.Ct. 1727 (2007). The KSR court made clear that a finding of teaching, suggestion and motivation to combine is not a rigid rule that limits the obviousness inquiry, but “there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” Innogenetics N.V., v. Abbott Laboratories, 2008 WL 151080 (Fed. Cir. 2008); citing KSR 127 S.Ct. 1727, 1741. In the present application, neither of the cited references teaches how to obtain a reverse-tapered sidewall of the photoresist film in the opening. The Examiner did not provide any reasonable explanation how the teaching by Lyons et al. can be modified in reference to Nozaki et al. in order to obtain the present invention. Moreover, even if the cited references can be combined as asserted by the Examiner, the results are not predictable. The claimed features of the present invention are not predictable results of the combination. *See* KSR 127 S.Ct. 1739. Thus, the invention recited in claims 1, 18 and 19 are not obvious over the cited references. Reconsideration of the rejection is respectfully requested.

(3) Newly added claims 24-26 are supported e.g. at page 12, line 25 to page 13, line 2. The features of these claims are not taught by the cited references. Claims 24-26 are not obvious over the cited references.

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(4) In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date. If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned representative at the telephone number indicated below to arrange for an interview to expedite the disposition of this case. If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
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Petition for Extension of Time
Amendment Transmittal